

SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

Water World

Making the most of every drop

Water quality research and education remain high priorities in the U.S. Department of Agriculture (USDA) /Land-Grant university partnership. In finding ways to prevent pollution and improve water quality, scientists provide a better understanding of how agricultural nutrients, pesticides and other potential contaminants move from the land where they are applied into rivers, streams, lakes and groundwater aquifers, where they can pose a risk to human health and the environment. Today's Land-Grant university efforts help us learn more about the stewardship of this indispensable natural resource and evaluate management practices that protect water quality.

Payoff

- **River watch.** Georgia's Conasauga River, considered among the most important ecological hot spots in the eastern United States, prompted an alliance with **Georgia** Extension, local government agencies, private landowners, farmers and utilities, turning an old farm into a wetland wildlife park. Almost five miles of river bank were replanted with trees, and new breeding areas were created for fish. Responding to increased levels of nitrogen and other nutrients, **North Carolina State** Extension faculty demonstrated new technologies to farmers, saving \$50,000 in nitrogen costs and reducing nitrogen use by 250 farmers in the Neuse River basin. Using best management practices introduced by **California** Extension, farmers reduced sediments in the San Joaquin River by 720,000 tons since 1991.
- **Surface runoff.** Non-point sources of pollution, such as farm fields, cause billions of dollars in damage each year. **Louisiana State** researchers quantified the movement of soil, plant nutrients, herbicides and insecticides in surface runoff from corn and sugarcane. Demonstrations taught these growers how to maintain profits while cutting herbicide use, which helped reduce the amount of herbicide in Louisiana surface waters. **Purdue** researchers developed a Web-based decision support system to look at the risk of pesticides reaching groundwater and surface water and to identify appropriate management strategies to protect water quality.

RESEARCH,
EXTENSION AND
EDUCATION
AT WORK

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- **Neighbor to neighbor.** **Maryland** Extension's educational package helps landowners understand riparian forest buffers and their functions and values in agricultural, urban and forested settings. It's now used as a model in **Pennsylvania** and **Virginia**. In **California**, ranch owners and managers learned how to comply with voluntary clean water legislation with the help of **California** Extension. Ranchers representing 50,000 acres signed on to assess non-point pollution sources and develop water quality management plans that identify needed changes in practices. An innovative educational program, Project NEMO (Non-point Education for Municipal Offices), through **Connecticut** Extension, focuses on protecting water resources through land use planning and using geographic information systems, remote sensing and web technologies. In an effort to help foster tourism, **New Hampshire's** Lakes Lay Monitoring Program trains more than 500 active volunteers to monitor 294 lakes, 276 streams and 129 watersheds for non-native fish, water quality trends and other recreational concerns.
- **Buffer zones.** Soil, sediments, pesticides and herbicides, especially atrazine, that drain from farm fields can pollute the nation's surface waters. They are a concern because surface water supplies about 50 percent of the nation's drinking water. Strips of vegetation between farm fields and streams can reduce runoff, but farmers need to know what types of buffer strips work best. **Nebraska's** study of four vegetative cover types is providing important information about the effectiveness of narrower strips, a more palatable option for landowners. **Cornell's** protection program, Stand by Your Stream, increases awareness of the importance and value of healthy streamsides and promotes good management practices.
- **"Scud" missiles and other natural solutions.** Land-Grant institutions have found natural solutions to help clean polluted water. Scientists at **South Dakota State** discovered how a common crustacean called a "scud" may provide a cost-effective method of evaluating water quality characteristics. These and other biomonitoring methods allow scientists and agencies to gain a better understanding of long-term water pollution trends. Scientists at **Illinois** found a native aquatic plant, called hornwort, shows promise for removing the atrazine, a herbicide, from water. A bushy, floating

plant, hornwort soaked up atrazine at a fairly rapid pace, dropping atrazine levels in water by a factor of two every three days. **Minnesota** researchers isolated a soil bacteria that degrades and mineralizes high concentrations of atrazine, a process that's effective, economical and fast.

- **Testing well.** More than 8,000 private well owners participating in **Montana** Extension's Private Well Water Testing Program got low-cost testing water quality assessments, test interpretations and recommendations for water treatment and well maintenance. In other efforts aimed toward private-well owners and domestic use, **Tennessee, Oklahoma, Georgia** and **Virginia** are among several states where Land-Grant universities helped test private water sources to help conserve water from private wells and springs.
- **Splish splash.** Efficient water use and application are critical to agricultural profitability and water quality protection. SPLASH, a **Nebraska** Extension one-on-one irrigation water management program, helps irrigators reduce water, energy and fertilizer use. This covers an annual water savings of 46.4 million gallons on roughly 35,000 acres irrigated by cooperators.



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